NAVAL BASE PHILADELPHIA-PHILADELPHIA NAVAL SHIPYARD,
STRUCTURAL ASSEMBLY SHOP
(Naval Base Philadelphia-Philadelphia Naval Shipyard,
Building No. 541)
League Island
Philadelphia
Philadelphia County
Pennsylvania

HAER No. PA-387-S

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Department of the Interior
P.O. Box 37127
Washington, D.C. 20013-7127

HAER
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HISTORIC AMERICAN ENGINEERING RECORD

NAVAL BASE PHILADELPHIA - PHILADELPHIA NAVAL SHIPYARD,
STRUCTURAL ASSEMBLY SHOP
(Naval Base Philadelphia - Philadelphia Naval Shipyard, Building No. 541)

HAER No. PA-387-S

Location:	Porter Avenue between 7th Street West and Bridge Street of the Philadelphia Naval Shipyard, League Island at the confluence of the Delaware and Schuylkill Rivers, in the City of Philadelphia, County of Philadelphia, Pennsylvania.
UTM Coordinates:	Zone Easting Northing 18 483820 4415330 Quad: Philadelphia, PA. - N.J. 1:24000
Construction Dates:	1939-1940
Architect/Builder:	Bethlehem Steel Company
Present Owner:	Commander, Naval Base Philadelphia - Department of the Navy
Present Use:	Structural Assembly Shop/Moldloft
Significance:	The building was used as a major assembly building for ship construction during World War II. It is 547 feet long, 403 feet wide and 115 feet high. The third floor houses the mold loft, a room having approximately 88,000 square feet of floor space where paper patterns of hull plating, bulkheads, and other ships components were laid out full size. An improved lofting process, optical detailing, developed in the 1960s, allowed lofting from 1/10 scale drawings of ship's lines. These processes have been replaced with computerized drafting systems.
Historian:	Robert C. Stewart, July 1994
Project Information:	This documentation project is part of the Historic American Engineering Record (HAER), a long range program to document historically significant engineering and industrial works in the United States. The HAER program is administered by the Historic American Buildings Survey/Historic American Engineering Record Division (HABS/HAER) of the National Park Service, U.S. Department of the Interior. The Naval Base Philadelphia - Philadelphia Naval Shipyard recording project was cosponsored

during the summer of 1994 by HABS/HAER under the general direction of Dr. Robert J. Kapsch, Chief, and by Naval Base Philadelphia, under the command of Rear Admiral Louise C. Wilmot.

The field work, historical reports and photographs were prepared under the direction of project leader Dean Herrin, HAER Historian and Craig Strong, HAER Architect. The recording team consisted of Robert C. Stewart, Historical Archaeologist, West Suffield, CT. The historical section of the report was produced by John Bacon, Philadelphia Maritime Museum and Robert C. Stewart. Jet Lowe, HAER, was responsible for formal photography. The interpretive drawings were delineated by Doug Anderson.

Others who contributed their time, advice, documents and help were: Jane Allen (Philadelphia Maritime Museum), Dan Cashin (Chief, Rigger Apprentice Training), Alfred Cavallero (Manager Design Branch-Public Works Engineering), Rich Chlan (Public Affairs Officer-PNSY), Ed Delany (Fire Administration), Ralph Edelman (Quality Assurance), John Fedak (coppersmith), Robert Gorgone (Deputy Business and Strategic Planning Officer-PNSY), John Hilliard (upholsterer), Ed Jones (Boilermakers), Frank Matusik (Foreman - Lofting), Frank Mellert (Architect - Public Works Engineering), Rosalie Moschella Pinto (Tacker - retired, 26 shop), Paul Niessner (Equipment Specialist - Cranes), Ed Ochmanowicz (Superintendent 31 Shop - Inside Machining), Steve Pandur (Leadingman - Fabric Workers - Sail Loft), Elaine Pelagruto (Beacon Editor), Tom Pierson (Loftsman), Cece Saunders (Historical Perspectives), Richard Scardino (leadingman - 11 shop - shipfitting), Martin Sheeron (Superintendent - Boilermakers), Commander Walter T. Talunas, USNR (Human Resources Transition Coordinator).

For additional information, see the following HAER documentation:

HAER No. PA-387	NAVAL BASE PHILADELPHIA - PHILADELPHIA NAVAL SHIPYARD (Overview, includes bibliography)
HAER No. PA-387-A	NBP-PNSY, DRYDOCK No. 1
HAER No. PA-387-B	NBP-PNSY, DRYDOCK No. 2
HAER No. PA-387-C	NBP-PNSY, DRYDOCK No. 3

HAER No. PA-387-D	NBP-PNSY, DRYDOCK No. 4
HAER No. PA-387-E	NBP-PNSY, DRYDOCK No. 5
HAER No. PA-387-F	NBP-PNSY, 350-TON HAMMERHEAD CRANE
HAER No. PA-387-G	NBP-PNSY, 3,000-POUND CRANE
HAER No. PA-387-H	NBP-PNSY, MANAGEMENT ENGINEERING (Bldg. No. 4)
HAER No. PA-387-I	NBP-PNSY, SUPPLY DEPT. STOREHOUSE (Bldg. No. 5)
HAER No. PA-387-J	NBP-PNSY, COMMANDER'S OFFICE-NAVAL BASE (Bldg. No. 6)
HAER No. PA-387-K	NBP-PNSY, STEEL STOREHOUSE (Bldg. No. 8)
HAER No. PA-387-L	NBP-PNSY, CARPENTRY SHOP (Bldg. No. 14)
HAER No. PA-387-M	NBP-PNSY, MACHINE SHOPS (Bldgs. No. 16 & 18)
HAER No. PA-387-N	NBP-PNSY, MACHINE SHOPS (Bldgs. No. 17 & 19)
HAER No. PA-387-O	NBP-PNSY, FOUNDRY/PROPELLER SHOP (Bldg. No. 20)
HAER No. PA-387-P	NBP-PNSY, STRUCTURAL SHOP (Bldg. No. 57)
HAER No. PA-387-Q	NBP-PNSY, AIRCRAFT STOREHOUSE (Bldg. No. 76)
HAER No. PA-387-R	NBP-PNSY, AIRCRAFT ASSEMBLY SHOP PLANT No. 2 (Bldg. No. 77H)
HAER No. PA-387-T	NBP-PNSY, PIPE COPPERSMITH SHOP (Bldg. No. 543)
HAER No. PA-387-U	NBP-PNSY, MATERIAL ASSEMBLY SHOP (Bldg. No. 592)
HAER No. PA-387-V	NBP-PNSY, MAIN SUPPLY WAREHOUSE (Bldg. No. 624)
HAER No. PA-387-W	NBP-PNSY, RESERVE BASIN AND MARINE RAILWAY

OPTICAL DETAILING AND LOFTING

Until about 1960, ships patterns and the shapes of pieces of hull plating were drawn out full size on paper patterns in this room, the mold loft. The loftsmen got down on their hands and knees and transferred measurements from a table of offsets to large sheets of stiff paper, trimmed them and sent them to a structures shop where the paper pattern shape would be traced on steel and cut out.

In the late 1950s a technique for doing lofting using 1/10 scale half-breadth plan was developed in Germany. It was used at Sun Shipbuilding and adopted at the Navy Yard in 1961. The Schicau Monopol System is shown in figure 1. Essentially, it allowed the lofter to construct an accurate 1/10 scale drawing of a ship's hull lines on a piece of aluminum plate. These plates and all lofting work were done in a temperature-controlled room to preclude errors induced from expansion or contraction of the drafting media. A cast iron frame was laid on those ship lines being scaled up, and a series of points were identified and duplicated between a series of needles and a flexible spline. This process would be repeated at several stations along the hull.
The cast iron frames would be inserted in another support which the loftsmen nicknamed the "iron horse."

The series of points defined by the needles represented a 1/10 scale, 3-dimensional model of the hull plating at the selected stations. A sheet of electrically conductive paper was slipped in the space defined by the needles and the splines. A high voltage was applied to the needles and a spark bumed a small hole in the paper at each needle point. The paper was removed and laid flat. A photograph of the paper and its marks was made on a glass plate at a 10:1 reduction. This glass plate then had a representation of the hull plate at a 100:1 reduction. After photographic processing, the glass plate was taken to an optical projector located about 85 feet above the structure shop floor. The image was projected down on to a flat steel plate and after optieal calibration, the projected shape was marked on the steel. Oxy-acetylene torches were used to cut the steel to shape. The hull plate was then rolled to a specified radius or bent to the desired configuration in the structures shop and then carried to the ship under construction. Sometimes plates were welded together to form substructures before being placed on the ship under construction.

For a list of related sources, see the bibliography at the end of the written report for HAER No. PA-387, Naval Base Philadelphia - Philadelphia Naval Shipyard.

ADDENDUM TO
NAVAL BASE PHILADELPHIA-
PHILADELPHIA NAVAL SHIPYARD,
STRUCTURAL ASSEMBLY SHOP
(Naval Base Philadelphia-
Philadelphia Naval Shipyard,
Building No. 541)
League Island
Philadelphia
Philadelphia County
Pennsylvania

HAER No. PA-387-S

PHOTOGRAPHS
WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN BUILDINGS SURVEY
National Park Service
Northeast Region
Philadelphia Support Office
U.S. Custom House
200 Chestnut Street
Philadelphia, P.A. 19106

HISTORIC AMERICAN ENGINEERING RECORD

NAVAL BASE PHILADELPHIA-PHILADELPHIA NAVAL SHIPYARD, STRUCTURAL ASSEMBLY SHOP
(Naval Base Philadelphia-Philadelphia Naval Shipyard, Building No. 541)

This report is an addendum to a 4-page report previously transmitted to the Library of Congress.

Location: League Island, Philadelphia, Philadelphia County Pennsylvania

UTM Coordinates:

Zone	Easting	Northing
18	483780	4415300

Quadrangle: Philadelphia, Pa.-N.J., 1:24,000

Date of Construction: 1938-1939; 1940 addition

Type of Construction: Steel-framed, sheathed in concrete block, glass, and asbestos-protected, metal panels

Designers: F.W. Hauptle, Navy Public Works
Hughes-Foulkrod Company, addition

Contractors: Master Masons Construction Company
Hughes-Foulkrod Company

Present Owner: United States Navy
Naval Facilities Engineering Command
10 Industrial Highway
Lester, Pennsylvania 19113-2090

Present Use: Demolished

Significance: The building was significant for its role in the construction of ships built at the Philadelphia Naval Shipyard in World War II and later years. The major space of the Structural Assembly Shop was used for assembly of large ship structures, such as stern sections and turrets. Its mold loft was used to prepare patterns of ship components, and the template storage area was used to store these patterns.

Project Information: The Structural Assembly Shop was determined eligible as a contributing resource of the Philadelphia Naval Shipyard Historic District. Its site is part of the Kvaerner shipyard, a commercial shipyard presently under construction in the southwest sector of the Philadelphia Naval Shipyard. To mitigate the adverse effect of its demolition, the Department of the Navy, the Pennsylvania State Historic Preservation Office, and the Advisory Council on Historic Preservation

have agreed that this building be documented to Historic American Engineering Record standards.

Preparers of Documentation:

Richard Meyer/Senior Project Manager
Douglas C. McVarish/Project Architectural Historian

John Milner Associates, Inc.
535 North Church Street
West Chester, Pennsylvania 19380

1999

Description of the Feature

The Structural Assembly Shop, Building No. 541, was designed and built in two stages. The original part of the building, the east portion, was approximately 328 feet wide across its south elevation, 395 feet deep, and a maximum of approximately 103 feet tall. With its 1940 addition, the size of the building was increased to 547 feet long and 403 feet wide. The extension was 59 feet tall. The total floor space of the original portion of the building was 230,661 square feet, while the floor space of the addition was 88,750 square feet. The total cubic space of the original building was 10,702,845, while the cubic feet of the extension was 4,906,200. The building was the largest at the Philadelphia Naval Shipyard in total cubic footage (U.S. Navy Bureau of Yards and Docks 1945).

In its original configuration, the building consisted of a front gabled, three story east block with a shallow roof pitch and a lower, single story west block. The east block contained a ground floor, a template storage floor, and a mold loft floor. An elevator penthouse projected from the southeast corner of the roof of the building. The east block was marked by a series of flat-roofed monitors, oriented east-west. The building was of steel-framed construction with columns spaced 25 feet apart. The entire building was constructed on concrete piles, and its roof was sheathed in asphalt.

As originally constructed, the lower portion of the first floor of the south elevation was open. Later, most of this wall was enclosed with corrugated metal siding, portions of which were fabricated in removable panels. Each panel was fenestrated with two lights. Spaced across the south elevation of the original block were two 30 foot wide loading door openings, each of which was covered by a drop canvas. The upper portions of the south wall were originally sheathed in asbestos-covered, corrugated metal siding. The south wall of the east block was fenestrated with ribbons of steel-framed, corrugated wire glass windows. The west elevation featured a single story lean-to. This lean-to had two, rolling, steel, overhead doors, ribbons of steel-framed, wire glass windows, and rectangular roof monitors. The upper wall of the main block was fenestrated with additional ribbons of steel-framed, wire glass windows. Its roof was punctuated with the ends of rectangular roof monitors. The first story of the north elevation was punctuated by three rolling, steel, overhead doors. The lower portion of the north wall was constructed of concrete block, while the upper portion was sheathed in asbestos-covered, corrugated metal siding. The remainder of the wall was sheathed in asbestos-covered, corrugated metal siding. As on the other elevations, the wall was pierced by ribbons of corrugated wire glass, steel-framed windows. The east elevation was clad in brick at the first story level and by asbestos-covered, corrugated metal siding above. First story openings included multi-light, steel-framed, industrial windows and single, louvered metal doors. Ribbons of corrugated wire glass windows marked the remainder of the wall plane, and the roof was punctuated by flat-roofed monitors.

As originally designed, the ground floor of the Structural Assembly Shop was largely open except for the steel column grid. Railroad tracks extended into the building from the east and west ends. Crane rails extended across this open space. The west block originally housed two 20/5 ton cranes, while the east block housed one 40/15 ton crane and one 20/5 ton crane in its west section and one 60/20 ton crane and one 20/5 ton crane in its east section. The floor of this portion of the building was a concrete slab. The mold loft was also largely open with the exception of an office that measured approximately 50 feet by 16 feet in its northeast corner. This office was separated from the rest of the floor by steel partition walls and

had two glass panel, wood doors. The mold loft floor was constructed of wood. A stair and elevator tower was located in the northeast corner of the building.

The west addition to the building measured approximately 200 feet wide across its south elevation and 400 feet deep along its west wall. Largely a single story in height, this addition was framed with steel columns anchored to concrete bases. The exterior appearance of this block was similar to the original block. Much of the exterior walls was sheathed in asbestos-protected, corrugated metal siding. Three loading door openings, each 30 feet wide, were spaced across the south elevation. Each opening could be closed off with a canvas sheet. In later years, overhead steel doors were installed in these openings. Remaining portions of the lower south wall included removable panels, each fenestrated with two windows. A ribbon of steel-framed, corrugated, wire glass windows extended across the south elevation about the loading door openings.

The north elevation of the addition, as most of the building, was sheathed in asbestos-protected, corrugated aluminum siding. The lower wall was fenestrated with large banks of corrugated wire glass windows, while the upper wall was fenestrated with a ribbon of corrugated, wire glass windows. The lower portion of the wall was sheathed with concrete blocks, and the ground level was punctuated by two loading dock openings, each of which contained a rolling, corrugated steel door.

The west elevation of the building was marked by the end walls of flat roofed monitors. Much of the west wall, as much of the rest of the building, was sheathed in asbestos-protected, corrugated aluminum siding. Most of this siding was salvaged from the original west wall and reused on the enlarged building. The upper portions of the west wall were fenestrated with two ribbons of steel-framed, corrugated wire glass windows. In most cases, the windows were reused from the original west elevation. Cage ladders spaced periodically across the west elevation provided access to the roof of the monitors. The lower level of the west elevation consisted of three, single-story, lean-tos. Each lean-to was constructed of concrete block and featured pre-cast concrete sills and lintels and reinforced concrete coping. The north lean-to was fenestrated with two ribbons of steel-framed, wire glass windows. A ramp led diagonally across its west elevation and provided access to a 6-light, second story door, and a steel ladder to the roof. The central lean-to was also marked by two ribbons of steel-framed, wire glass windows. The first story was punctuated by sliding loading doors for tool service and by four entry doors containing either six or nine lights. The south lean-to was the mirror image of the north lean-to. Steel, rolling doors were placed in the west wall of the block in the two recesses between the lean-tos. These doors were also reused from the original west wall.

The bulk of the addition was open assembly space with a 12 inch, concrete slab floor. Railroad tracks extended through the loading door openings on the north and south walls. Those on the north side extended 55 feet into the building, while those on the south side extended 90 feet into the building. A series of 2.2, 2.5 and 5.0 ton wall cranes ran on tracks that extended the depth of the building.

The first story of Lean-to No. 1 (the north lean-to) contained locker rooms, wash rooms, toilet rooms, and showers, as did the first floor of the identical Lean-to No. 3. The central Lean-to No. 2 contained tool rooms in its northern section, and a welding material room and office in its southern section. A narrow, lower lean-to, containing tool service, projected from its west wall and was entered by six-light doors in its end walls. The second floor of Lean-to No. 2 contained a large, concrete-floored, open instruction

room in its north section. Stairs from the first floor were located in the southern portion, as were two offices. Each office had linoleum floors over a concrete base.

History

The site of the Structural Assembly Shop had previously been used for the storage of large guns and other heavy equipment. A concrete blacksmith shop that measured 18 feet long, 12 feet wide, and 10 feet high, stood on a portion of the site. Site clearance work began on July 5, 1938. Foundation excavation began on August 3, 1938 and was completed on February 14, 1939. By August 31, 1938, temporary field offices had been erected, and temporary water, air and electric services installed. Base lines and monuments for foundation construction had been established, and nine test piles had been driven to a depth of 50 to 75 feet. Initial work was undertaken by laborers of the Work Projects Administration with an initial average daily work force of 10 men, a total that later grew to 80 men. The initial stages of work included the placing of 42 footings, the excavation of 6,827 cubic yards of earth, the placing of 62,626 square feet of wood sheeting, the driving of 970 wood piles, the placing of 23,366 square feet of concrete forms, and the placing of 1,604 cubic yards of concrete.

The second stage of construction was undertaken by the Master Masons Construction Company under a Public Works Administration contract. This work began on November 1, 1938 and was completed on February 8, 1939. The average work force was 41 men. Work accomplished included the excavation of 3,500 cubic yards of earth; the placing of 27,786 square feet of wood sheeting, 860 wood piles, and 32 composite piles; the placing of 17,276 square feet of concrete forms and 1,343 cubic yards of concrete; and the installation of 13,700 pounds of anchor bolts.

Hughes Foulkrod Company was awarded the contract for the erection of the building. The company commenced its portion of the construction contract on January 4, 1939. Its average daily workforce ranged from 74 to 100 men. By March 31, 1939, the firm reported that the steel framing of the building was 61% complete, the roof lumber was 12% complete, the steel painting was 10% complete, and the roof drains and downspouts were 60% complete (Navy Yard, Philadelphia).

Building No. 541 played a critical role in ship construction and repair. The manufacture of vessel parts for new construction and repair began in the forge shop where blacksmiths produced forgings and metal shapes of up to 12 tons. The steel components were then machined and assembled in a number of different shops. The inside machine shop was responsible for planing and drilling parts. From there, components were forwarded to the structural shop (Building No. 541) where shipfitters, riveters, and craftsworkers from 12 other trades assembled and installed large structures, such as stern sections and turrets (Heinrich 1994:4). A series of cranes and railroad tracks enabled components to be moved into the building for assembly and for the assembled components to be moved to nearby shipways or dry docks for final assembly (Swanson 1940:23).

In September 1940, the Commandant of the Philadelphia Naval Yard requested $15,000 from the Chief of the Bureau of Ships to provide template stowage racks in Building No. 541:

> The funds appropriated for the erection of this building were not adequate to cover the provision of any template stowage racks for the template stowage area located under the

> Mold Loft, and with the new construction program in hand it is imperative that suitable racks be provided in the template stowage space for the proper handling and stowage of templates (Commandant 1940).

A July 1943 memorandum from the Commandant of the Philadelphia Naval Shipyard to the Chief of the Bureau of Yards and Docks noted some of the activities and machinery in use at the Structural Assembly Shop:

> A number of large and expensive machine tools, such as pit planers, radial drills, etc., are now being installed in Bay No. 1 (East Bay), Structural Assembly Building. In the adjoining four bays of this building extensive structural assembly and fabricating work is being performed, which involves the constant movement of materials. These activities cause a quantity of fine dust, highly charged with metallic particles, to spread throughout the building. Since completing the installation of several new machine tools in Bay No. 1 it has become apparent that this expensive machinery will be adversely affected by the highly injurious dust, and excessive wear and eventually expensive replacements will result (Commandant 1943).

His proposed remedy was to install a sheet metal partition between bays 1 and 2 and to install unit heaters in selected locations.

The building's top floor housed a mold loft where full-sized paper or scaled-down photographic patterns or templates of ship components were made. The patterns were transferred to steel plates which were then cut to shape with oxyacetylene torches. In his *Modern Shipfitter's Handbook*, William E. Swanson wrote about the use of templates in ship construction:

> In a modern shipyard, a considerable amount of plate and shape cutting is done with machine shears, planers and hand cutting torches. The template for the shape to be cut is clipped to the material, the lines and punch marks are transferred from the template, and then the material is cut to the line....Much plate cutting is now done on machines which may be 100 feet long, with an acetylene cutting machine called a Travograph. A moving bar carries cutting torches and a template tracer down the table, with the torches following each change in direction of the hand- manipulated tracer, so that transfer of measurements from template to plate is unnecessary (Swanson 1940:45).

The original block of the building was designed by F.W. Hauptle of the Naval Public Works Department. Hauptle was also the architect of several other shipyard buildings, including Building No. 591 (Test Boiler House), Building No. 592 (the Material Assembly Shop), Building No. 694 (Store House), and Building No. 743 (Gun Shed). The addition was designed by staff of Hughes-Foulkrod Company, general contractors, of Philadelphia. Drawings were signed by H.M. Logan and A.A. Crowell. Hughes-Folkrod Company also designed the World War II-era addition to Building No. 94.

With the end of World War II, shipbuilding activity at the yard abruptly stopped. The structural shop workforce, which had totaled 10,500 in 1945, fell to 700 by 1949 (Heinrich 1994:10). In later years, use of the building declined as the shipyard built and overhauled few ships.

Mike Thompson, who worked as an electrician at the building, remembered that the east bay was reopened in 1976-1977 to accommodate a modem, plasma arc, plate cutting machine. This machine featured a large steel table and a projection apparatus mounted on the ceiling of the bay. This apparatus projected an image of a template pattem onto the steel to facilitate cutting. At that time, the remainder of the building was not in use. Thompson reported that owls were released in the remaining bays to kill rats that threatened to overrun the building.

Thompson worked in the building between 1976 and 1978 as an electrical apprentice repairing welding equipment. The major use of the building during the latter part of this period was the rebuilding of the cruiser *USS Belknap*, damaged after a collision with the aircraft carrier *USS John F. Kennedy* in the Mediterranean. He recalled that a major portion of the superstructure of the *Belknap* was rebuilt in Building No. 541 prior to its removal to the remainder of the vessel in dry dock. Thompson also remembered that the building was the site of the first welding robot used at the shipyard.

Between 1978 and 1981, Thompson continued to work in the building when it was used for the Service Life Extension Program (SLEP). A major use of the building during that period was as a satellite shop for the 38 shop (outside machinists). The 38 shop placed portable tools, such as milling machines, in the building, and used these tools to overhaul ship parts, such as rudders and catapults. Other portions of the building were used by the 56 shop for the manufacture and installation of pipes, pipe fittings, and pipe covering, and by the 26 shop for welding. The remainder of the building was used for storage of parts for ships undergoing overhaul. Conditions could be harsh in the building during the winter months, because the main fabrication space was unheated (Thompson 1999).

Ron Reeves, a former employee of the 17 shop (sheetmetal) at the shipyard described the layout of Building No. 541 in its last years:

> 541 had the shipfitters loft upstairs, and outside machine shop had part of the building in the back. There were locker rooms on both floors accessible from the outside. Pipefitters had some areas there for large piping projects. The shipfitters had the area near the east end for large assemblies and the elevator to [the] second floor was there (Reeves 1998).

Another former shipyard employee remembered that Building No. 541 housed a welding school, an annex of the main welding school in Building No. 94. He reported that the main use of the building was to fabricate large sections of hull prior to shipping them out to the dry docks for installation (Philly YardBird 1998).

The Structural Assembly Shop was demolished in 1998 to accommodate construction associated with the Kvaemer shipyard.

SOURCES OF INFORMATION/BIBLIOGRAPHY

Interview

Interview with Mike Thompson, former electrical foreman in Building No. 501. January 26, 1999.

Architectural Drawings

Collection of approximately 150 architectural drawings prepared by Navy Department, Bureau of Yards and Docks and Hughes Foulkrod Company for original building and extension, 1938-1940. Cushman & Wakefield, Inc., Building No. 501, Philadelphia Naval Shipyard.

Historic Views

Approximately 65 photographs of the construction of Building No. 541. RG 71, Prints and Photographs Branch, National Archives, College Park, Maryland. (Representative illustrations are reproduced on pages 15 to 29 which follow.)

Unpublished/Primary Sources

Commandant, Philadelphia Naval Shipyard
1940 [Memorandum to the Chief of the Bureau of Ships concerning need for template stowage racks in Building No. 541]. September 1940. In RG 19, Bureau of Ships, Textual Records Branch, National Archives, College Park, Maryland.

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Heinrich, Thomas.
1994 Philadelphia Naval Shipyard Oral History Project: Research Report. Typescript in files of the Independence Seaport Museum, Philadelphia.

Philly YardBird
1998 Electronic mail message to Douglas C. McVarish. December 19, 1998.

Reeves, Ron
1998 Electronic mail message to Douglas C. McVarish. December 25, 1998.

Navy Yard, Philadelphia
Navy Yard, Philadelphia, Pa., WPA-PWA Federal Construction Project, Progress reports, 1938 to 1940. Structural Assembly Shop. In RG 71, Prints and Photographs Branch, National Archives, College Park, Maryland.

Secondary and Published Sources

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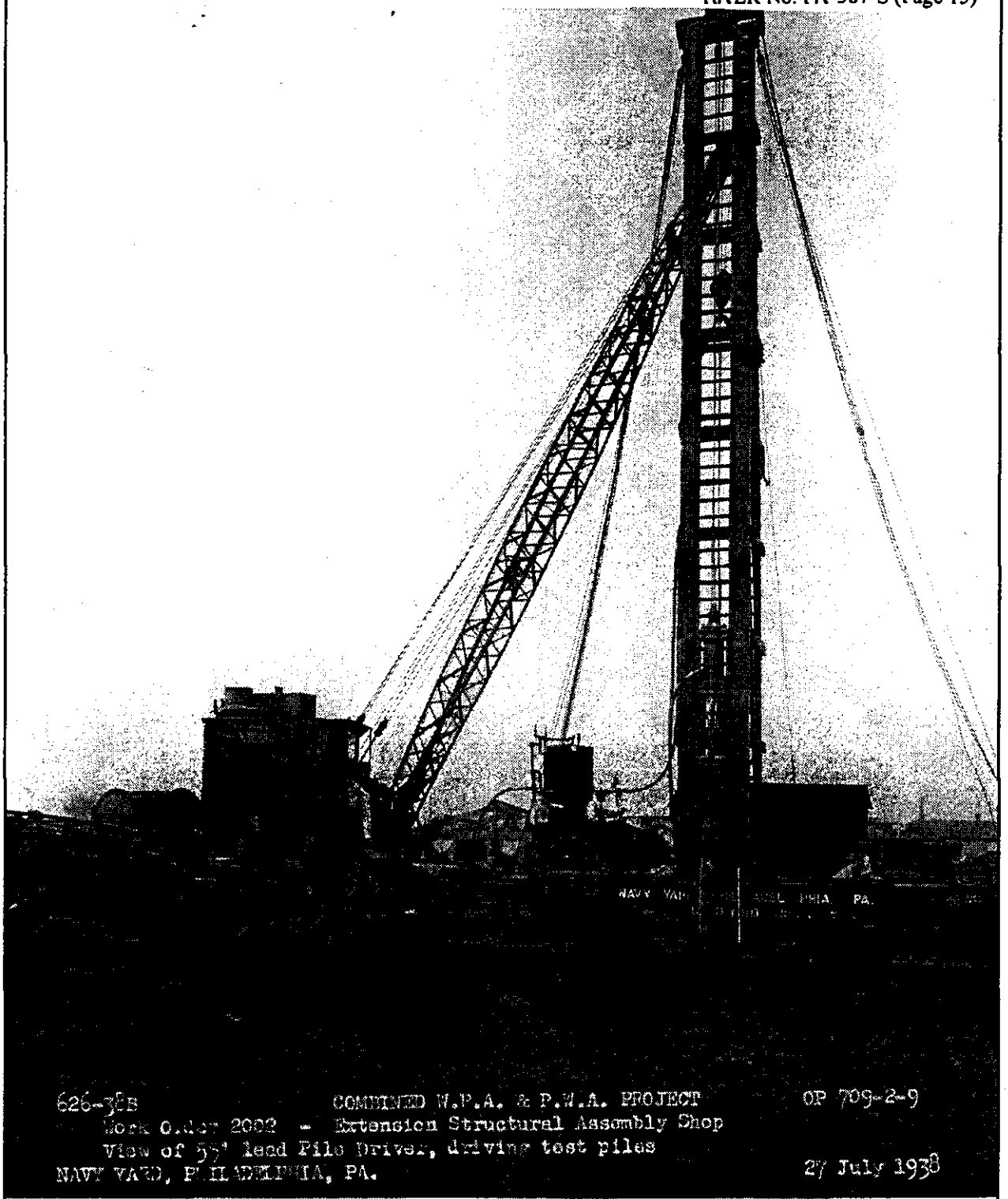
1940 *Modern Shipfitter's Handbook*. Cornell Maritime Press, New York, 1940.

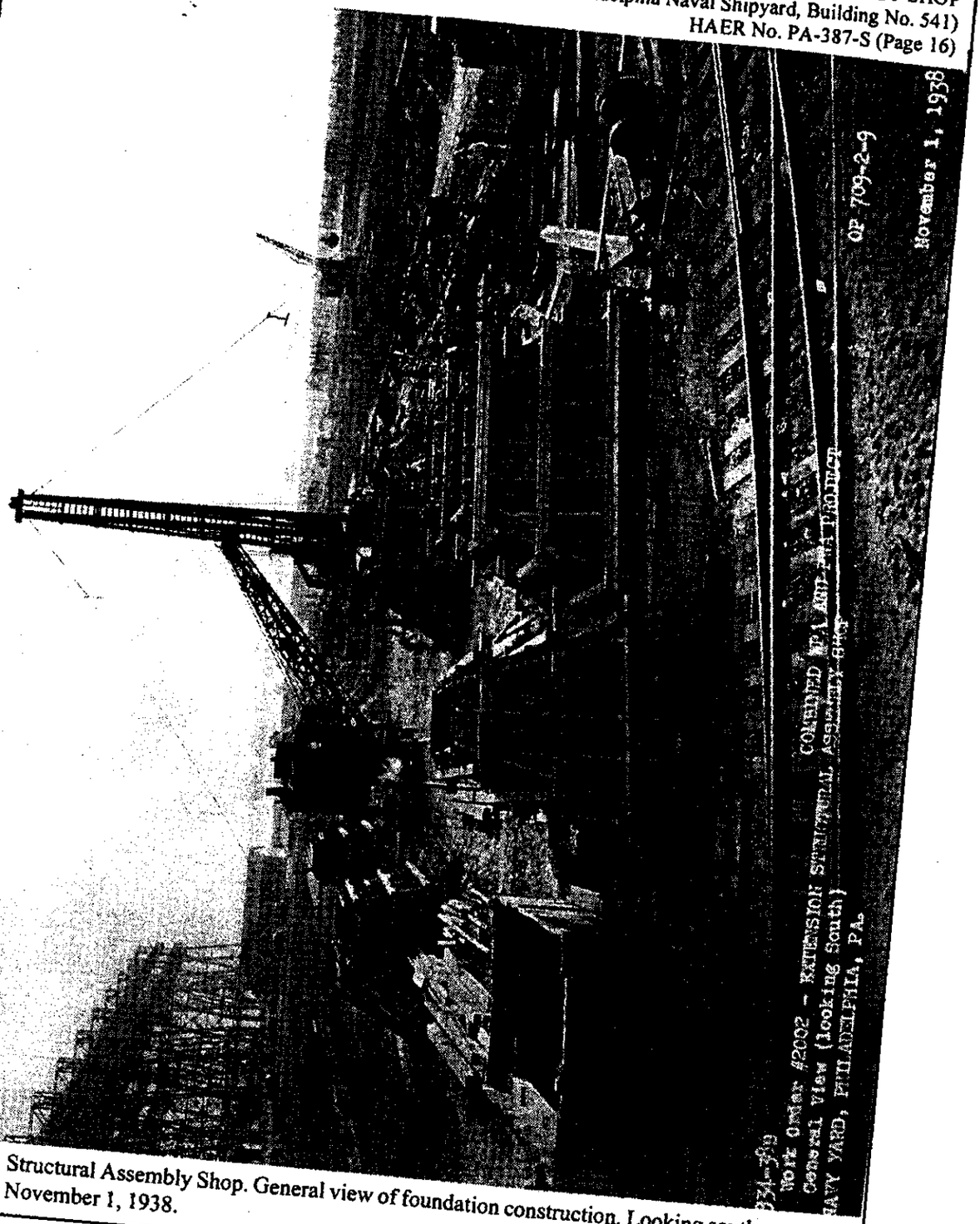
U.S. Navy Bureau of Yards and Docks.
1945 *Public Works of the Navy Data Book. Buildings*. NAVDOCKS P-164. Bureau of Yards and Docks, Washington, D.C.

Plan of west end, Philadelphia Naval Shipyard, showing location of Structural Assembly Shop (Building No. 541).



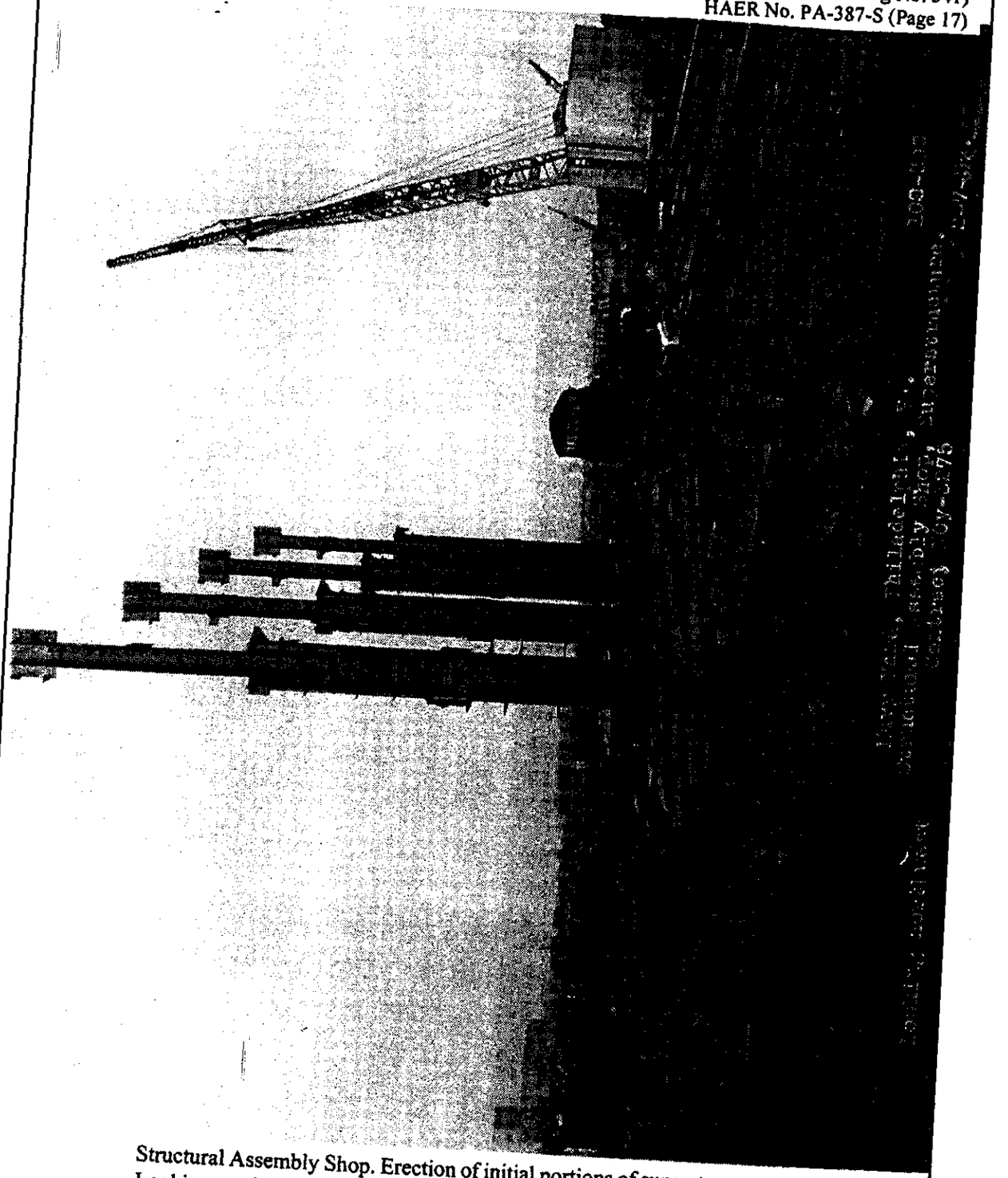
Structural Assembly Shop. View of 55 foot lead pile driver driving test piles. July 27, 1938.

Original at Prints & Photographs Branch, National Archives, College Park, Maryland (RG71)



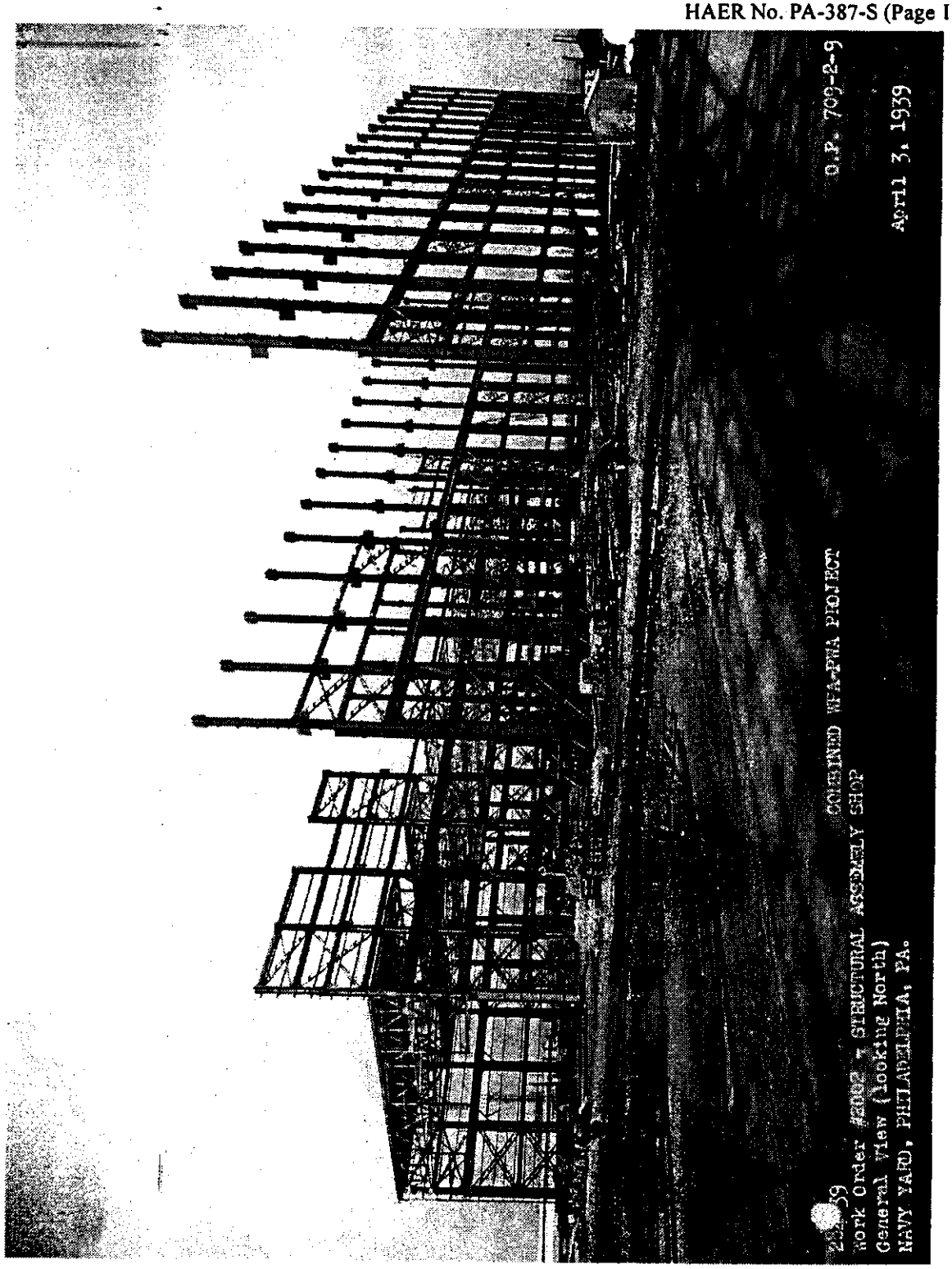
Structural Assembly Shop. General view of foundation construction. Looking south. November 1, 1938.

Original at Prints & Photographs Branch, National Archives, College Park, Maryland (RG71)



Structural Assembly Shop. Erection of initial portions of superstructure. Looking northwest. February 7, 1939.

Original at Prints & Photographs Branch, National Archives, College Park, Maryland (RG71)

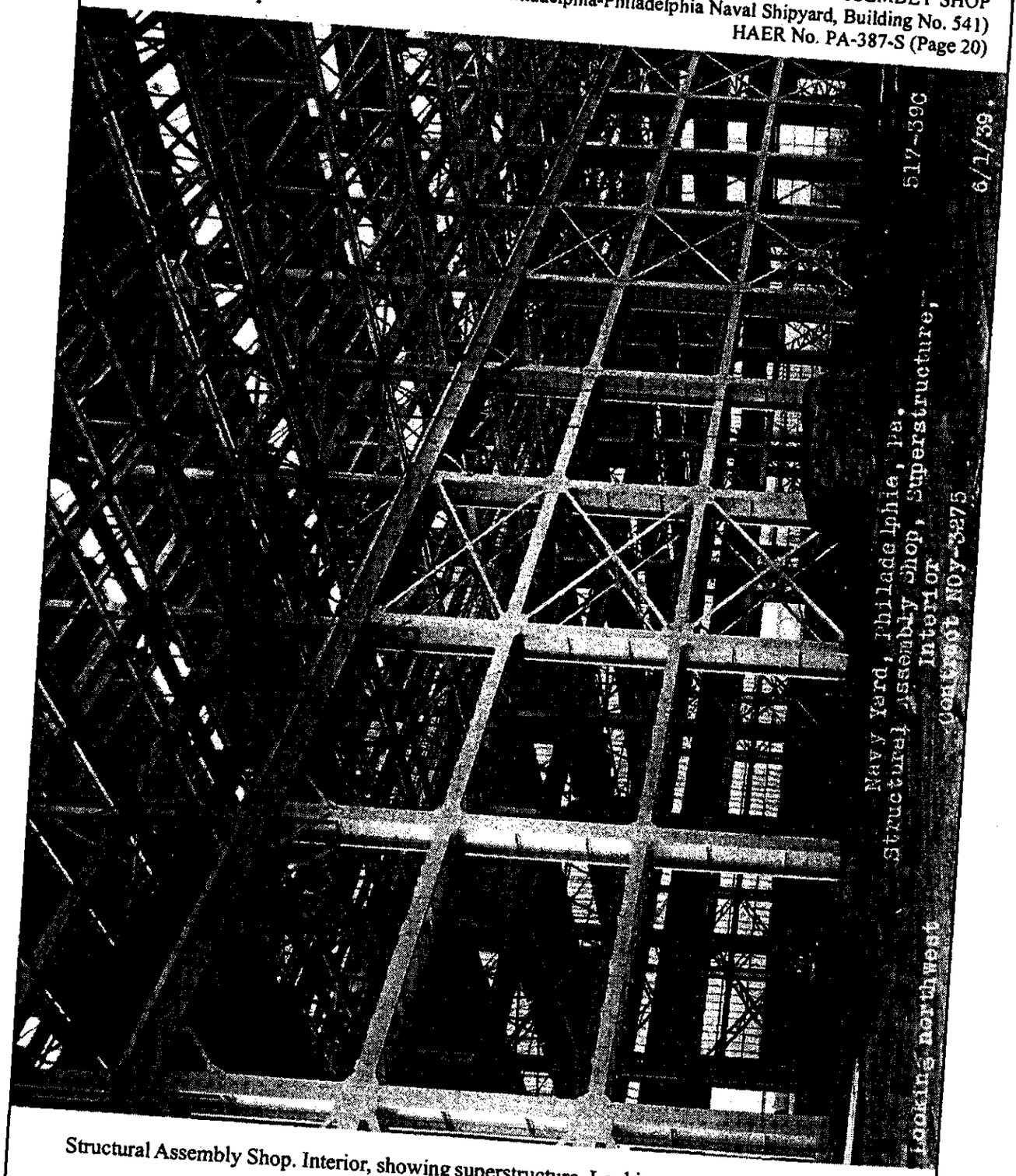


Structural Assembly Shop. General view of superstructure. Looking north. April 3, 1939.

Original at Prints & Photographs Branch, National Archives, College Park, Maryland (RG71)

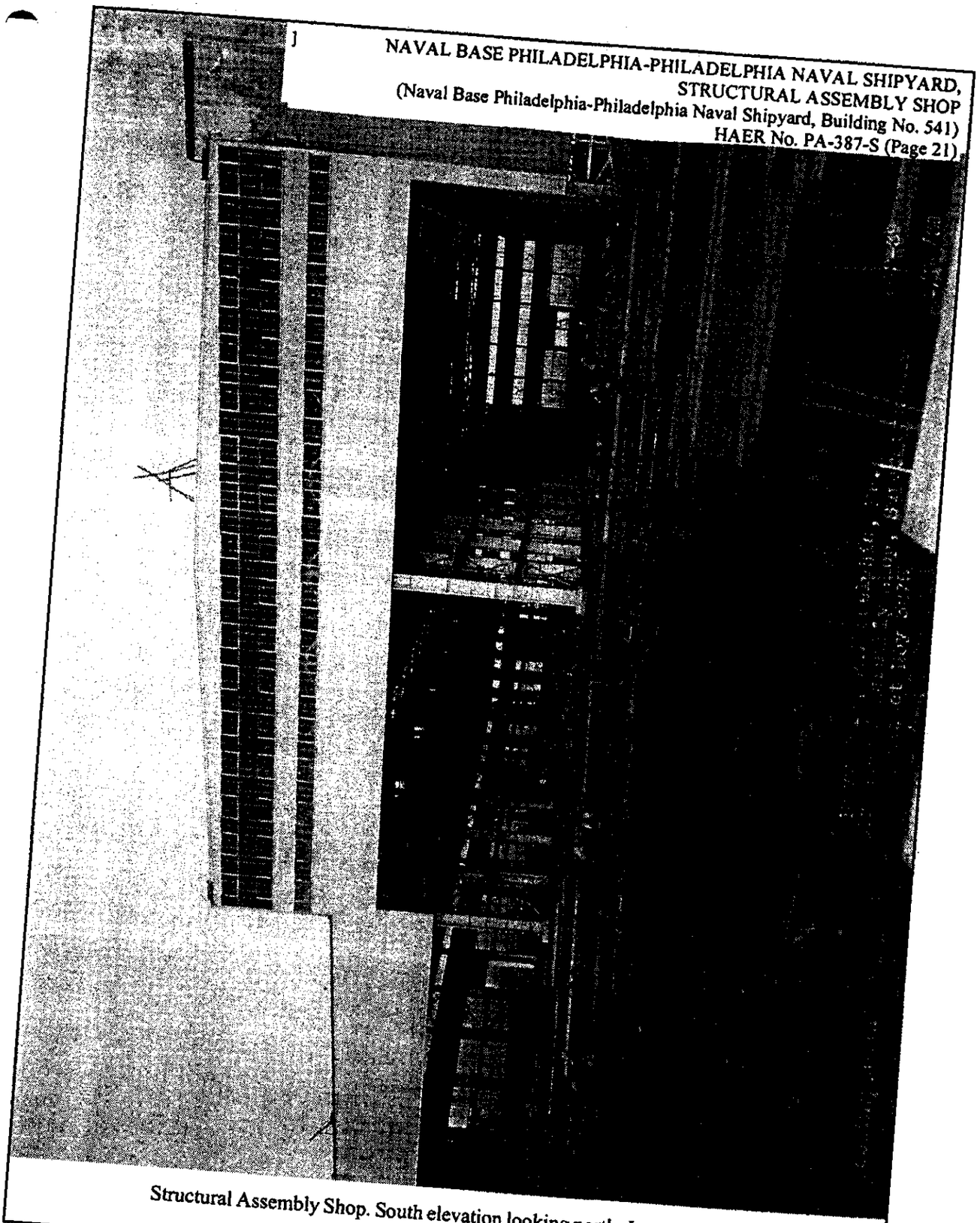
Structural Assembly Shop. General view of superstructure showing installation of initial portions of the sheathing. Looking northeast. May 1, 1939.

Original at Prints & Photographs Branch, National Archives, College Park, Maryland (RG71)



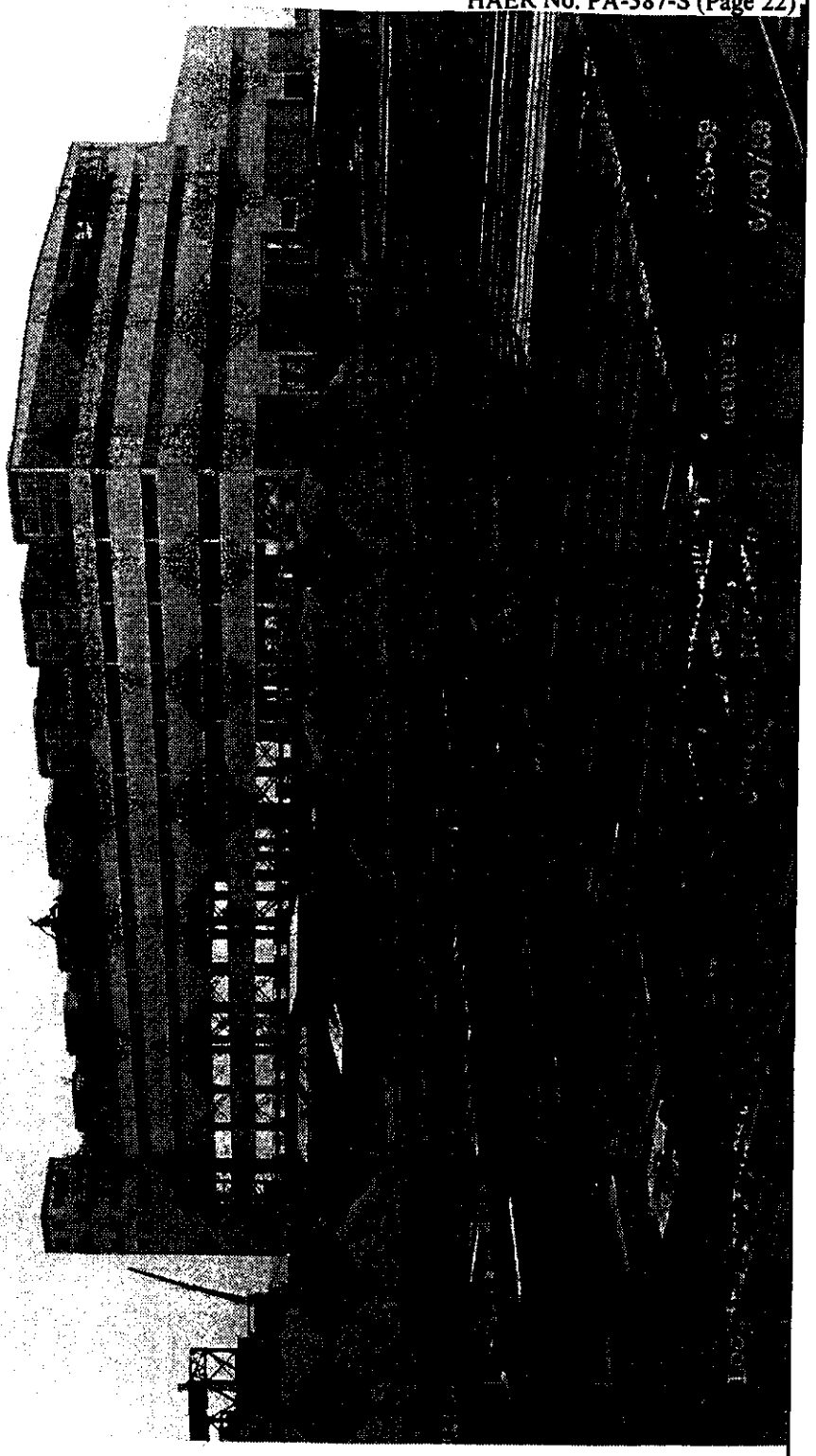
Structural Assembly Shop. Interior, showing superstructure. Looking northwest. May 1, 1939.

Original at Prints & Photographs Branch, National Archives, College Park, Maryland (RG71)



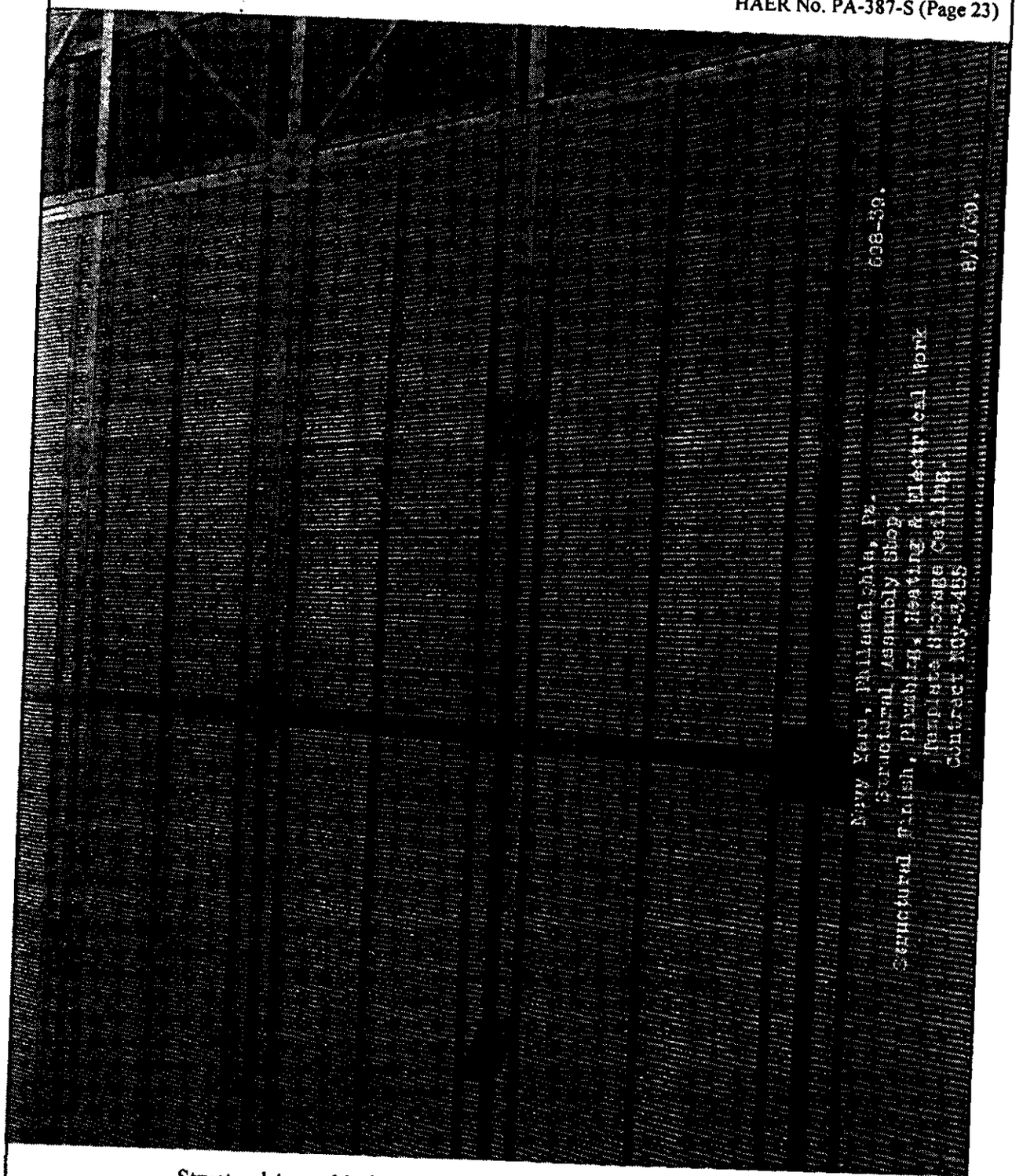
Structural Assembly Shop. South elevation looking north. June 30, 1939.

Original at Prints & Photographs Branch, National Archives, College Park, Maryland (RG71)



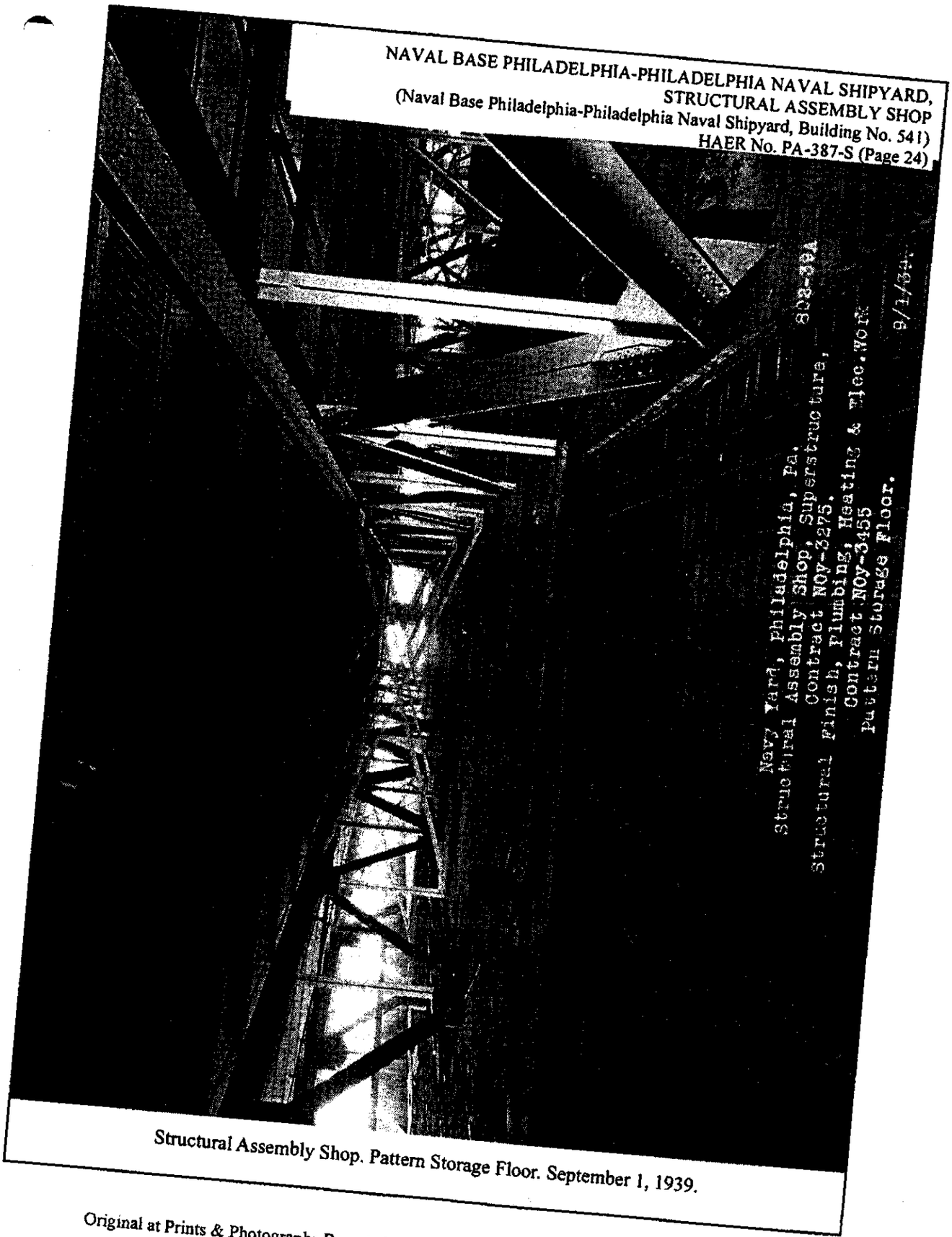
Structural Assembly Shop. West and north elevations looking southeast. June 30, 1939.

Original at Prints & Photographs Branch, National Archives, College Park, Maryland (RG71)



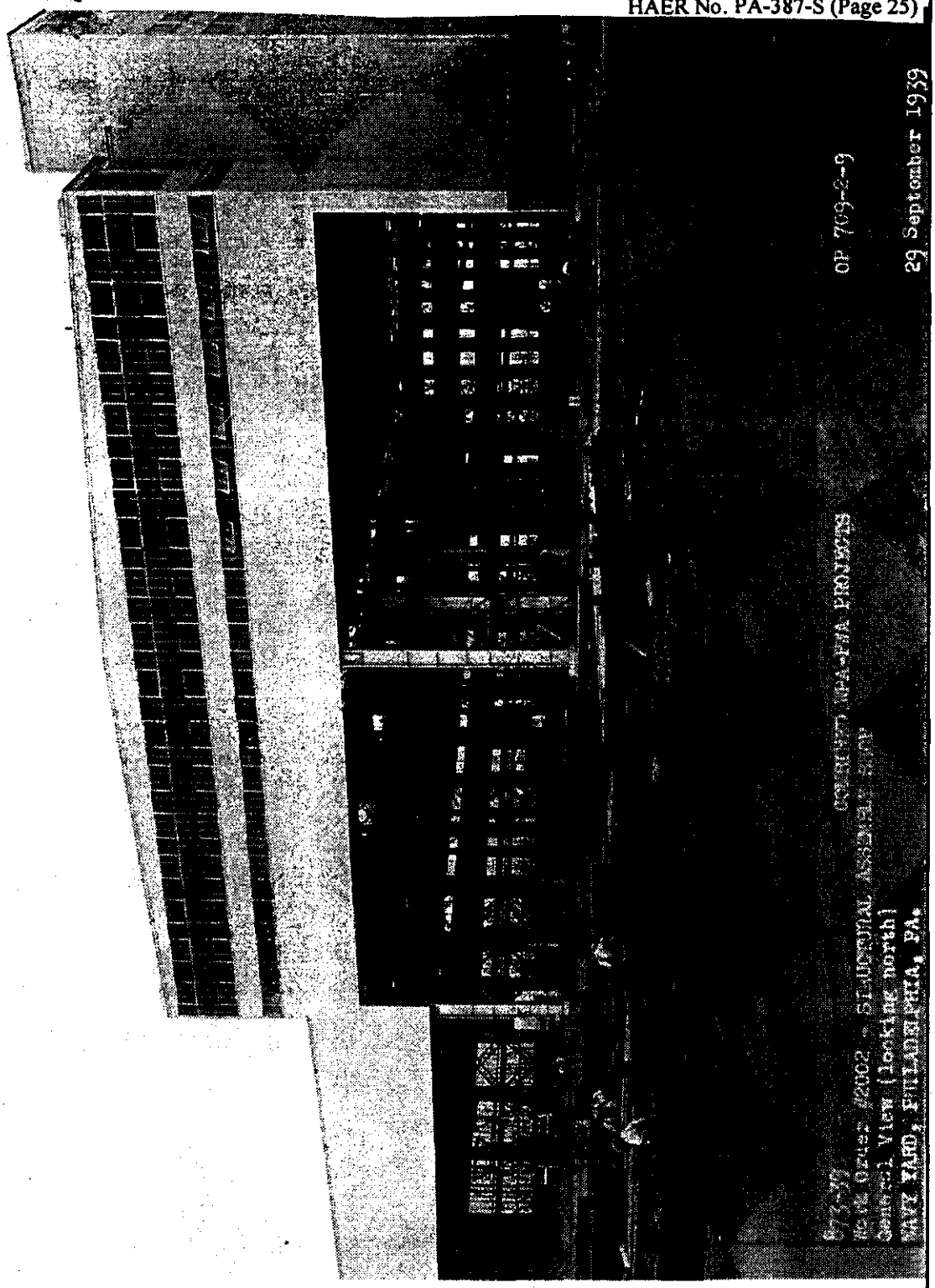
Structural Assembly Shop. Template storage ceiling. August 1, 1939.

Original at Prints & Photographs Branch, National Archives, College Park, Maryland (RG71)



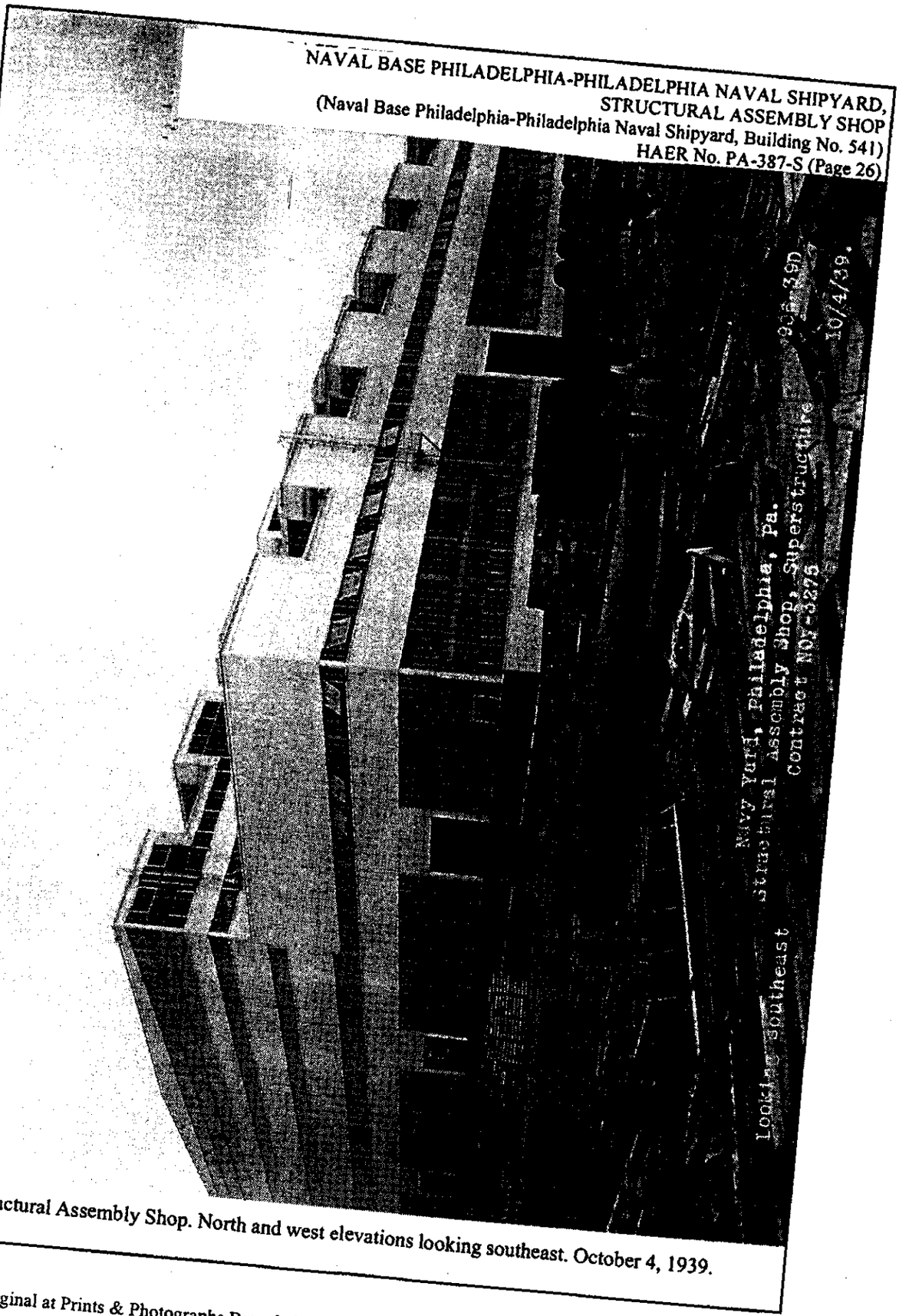
Structural Assembly Shop. Pattern Storage Floor. September 1, 1939.

Original at Prints & Photographs Branch, National Archives, College Park, Maryland (RG71)



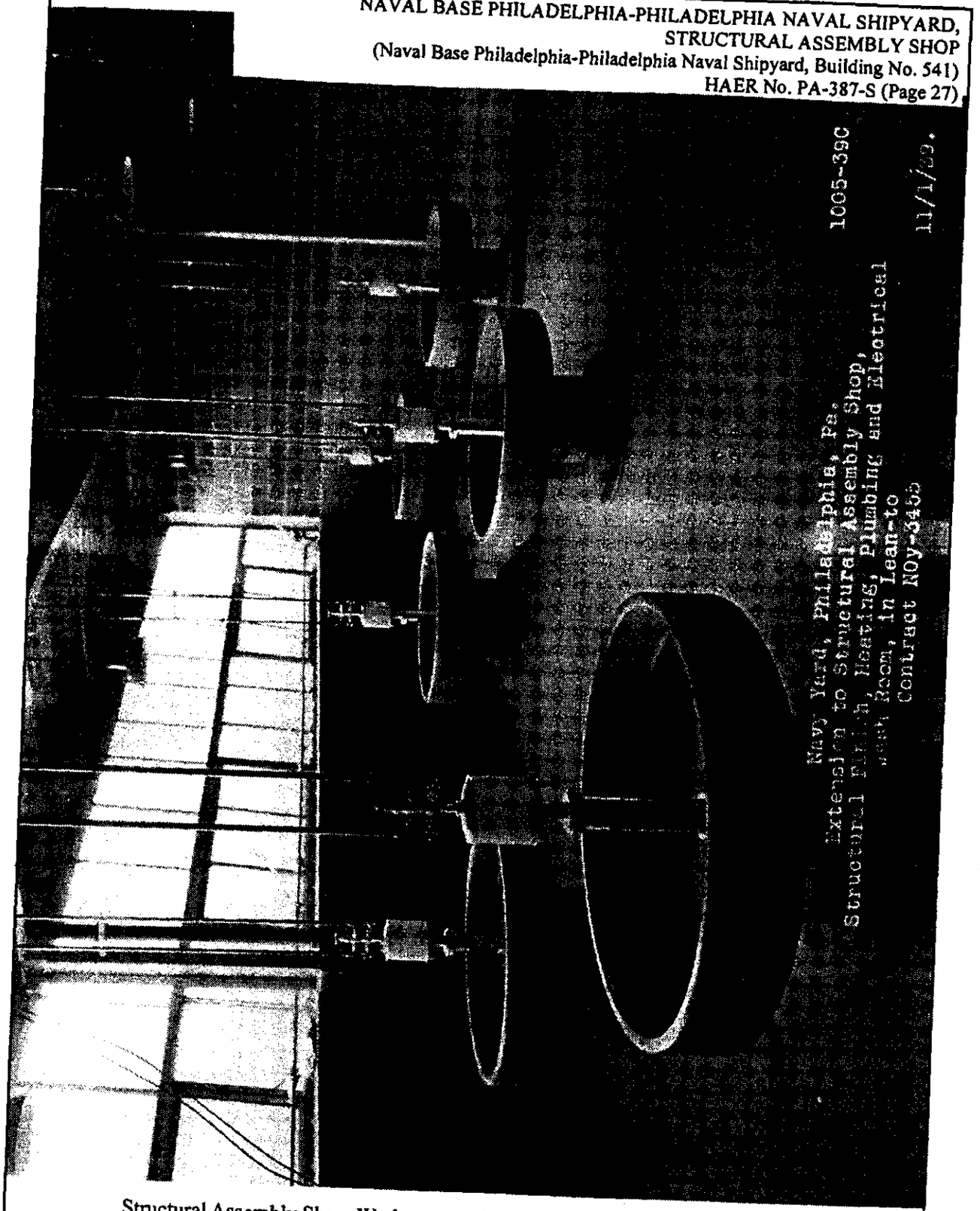
Structural Assembly Shop. South elevation looking north. September 29, 1939.

Original at Prints & Photographs Branch, National Archives, College Park, Maryland (RG71)



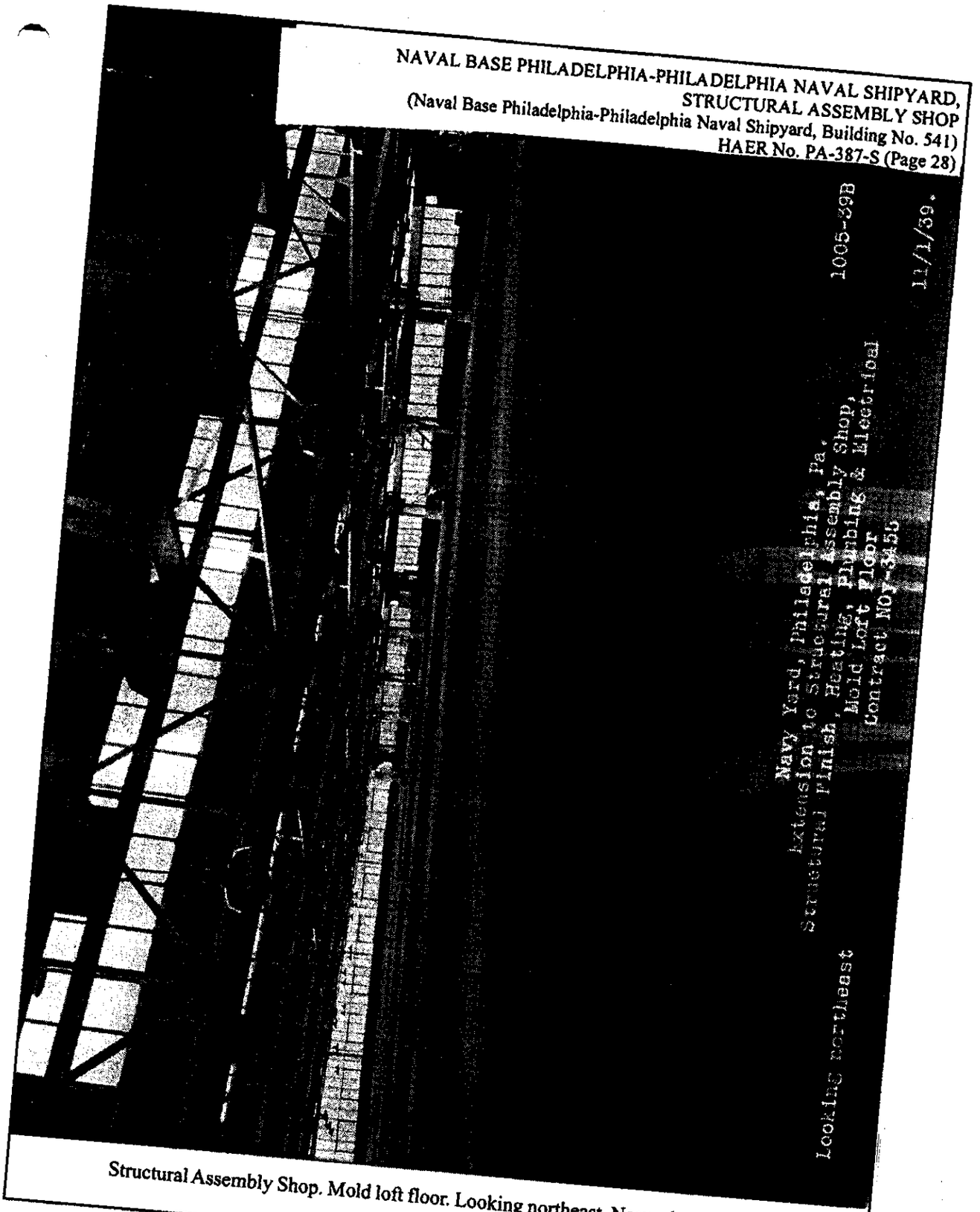
Structural Assembly Shop. North and west elevations looking southeast. October 4, 1939.

Original at Prints & Photographs Branch, National Archives, College Park, Maryland (RG71)



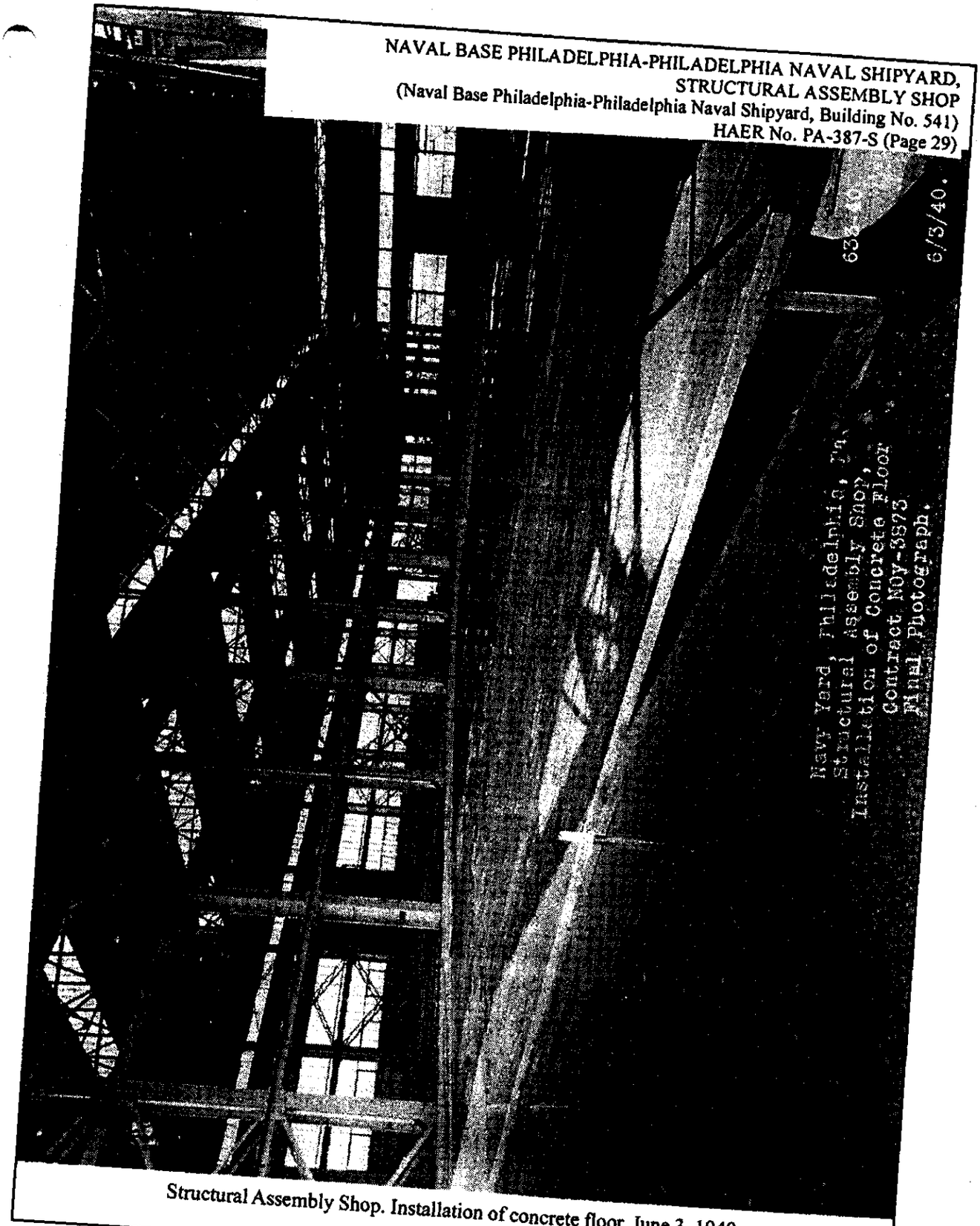
Structural Assembly Shop. Wash room in lean-to, west side. November 1, 1939.

Original at Prints & Photographs Branch, National Archives, College Park, Maryland (RG71)



Structural Assembly Shop. Mold loft floor. Looking northeast. November 1, 1939.

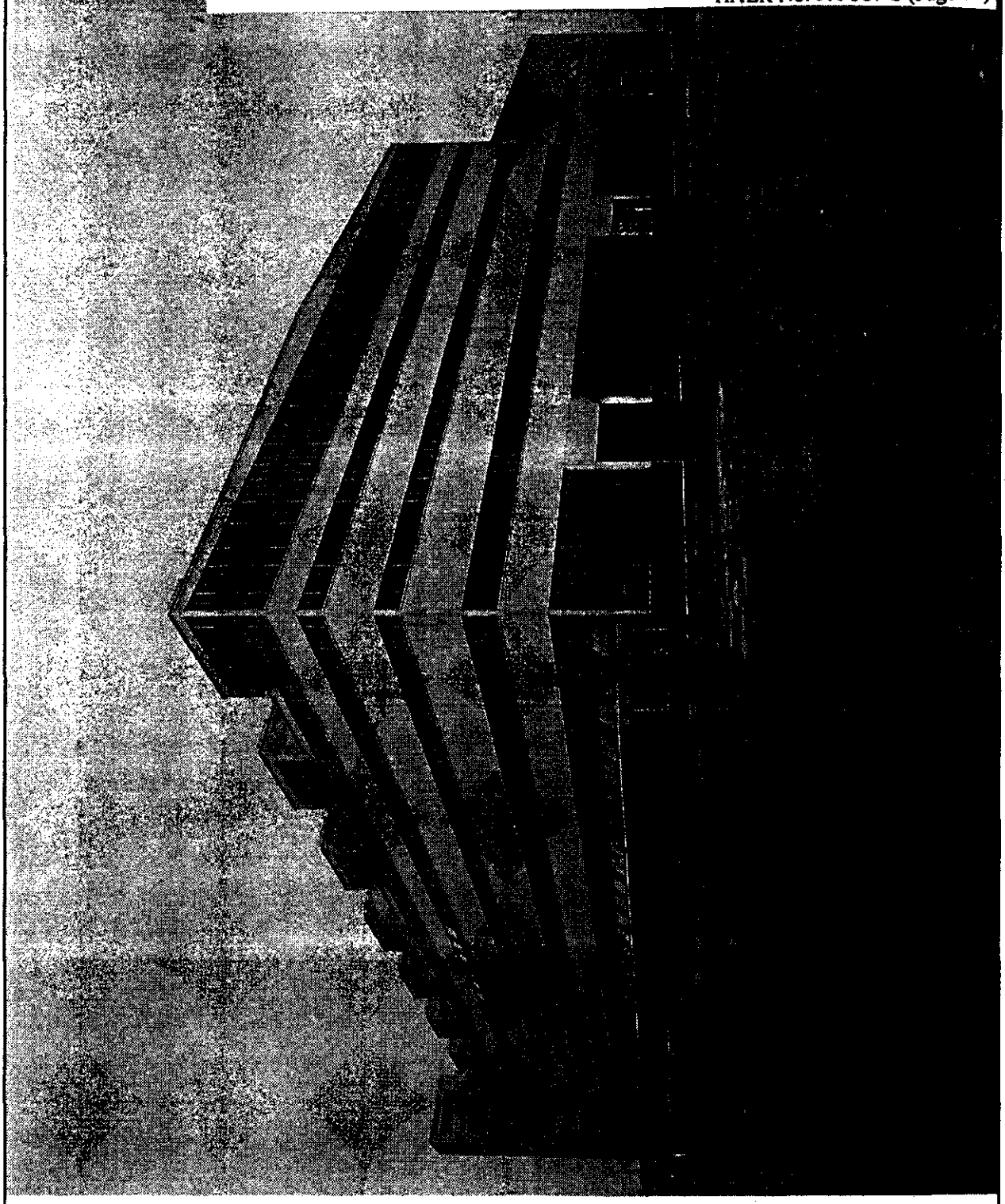
Original at Prints & Photographs Branch, National Archives, College Park, Maryland (RG71)



Structural Assembly Shop. Installation of concrete floor. June 3, 1940.

Original at Prints & Photographs Branch, National Archives, College Park, Maryland (RG71)

NAVAL BASE PHILADELPHIA-PHILADELPHIA NAVAL SHIPYARD,
STRUCTURAL ASSEMBLY SHOP
(Naval Base Philadelphia-Philadelphia Naval Shipyard, Building No. 541)
HAER No. PA-387-S (Page 30)



Structural Assembly Shop. North and east elevations. Looking southwest. No date.

Original at Prints & Photographs Branch, National Archives, College Park, Maryland (RG71)